



## Prediction of the wash-off of traffic related semi- and non-volatile organic compounds from urban roads under climate change influenced rainfall characteristics

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### Abstract:

Traffic generated semi- and non-volatile organic compounds (SVOCs and NVOCs) pose a serious threat to human and ecosystem health when washed off into receiving water bodies by stormwater. Climate change influenced rainfall characteristics makes the estimation of these pollutants in stormwater quite complex. The research study discussed in the paper developed a prediction framework for such pollutants under the dynamic influence of climate change on rainfall characteristics. It was established through principal component analysis (PCA) that the intensity and durations of low to moderate rain events induced by climate change mainly affect the wash-off of SVOCs and NVOCs from urban roads. The study outcomes were able to overcome the limitations of stringent laboratory preparation of calibration matrices by extracting uncorrelated underlying factors in the data matrices through systematic application of PCA and factor analysis (FA). Based on the initial findings from PCA and FA, the framework incorporated orthogonal rotatable central composite experimental design to set up calibration matrices and partial least square regression to identify significant variables in predicting the target SVOCs and NVOCs in four particulate fractions ranging from >300 to 1  $\mu\text{m}$  and one dissolved fraction of 300-1  $\mu\text{m}$  range, similar distributions of predicted and observed concentrations of the target compounds from minimum to 75th percentile were achieved. The inter-event coefficient of variations for particulate fractions of >300-1  $\mu\text{m}$  was 5-25%. The limited solubility of the target compounds in stormwater restricted the predictive capacity of the proposed method for the dissolved fraction of

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### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality

**Food/Water Quality:** Chemical

#### Geographic Feature:

resource focuses on specific type of geography

Freshwater, Urban

# Climate Change and Human Health Literature Portal

## **Geographic Location:**

resource focuses on specific location

Non-United States

**Non-United States:** Australasia

## **Health Impact:**

specification of health effect or disease related to climate change exposure

Cancer, Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

**Cardiovascular Effect:** Other Cardiovascular Effect

**Cardiovascular Disease (other):** Cardiopulmonary mortality

**Respiratory Effect:** Upper Respiratory Allergy

## **Mitigation/Adaptation:**

mitigation or adaptation strategy is a focus of resource

Adaptation

## **Model/Methodology:**

type of model used or methodology development is a focus of resource

Exposure Change Prediction

## **Resource Type:**

format or standard characteristic of resource

Research Article

## **Timescale:**

time period studied

Medium-Term (10-50 years)

## **Vulnerability/Impact Assessment:**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content